Sept. 18, 1945. F. BRUNNER ET AL 2,384,887

MECHANICAL COCKING DEVICE FOR AUTOMATIC FIREARMS

Filed April 3, 1940 3 Sheets-Sheet 1

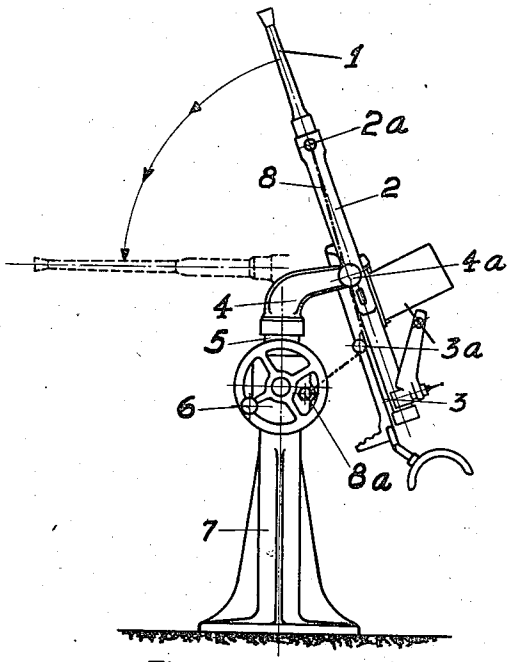

Fig. 1

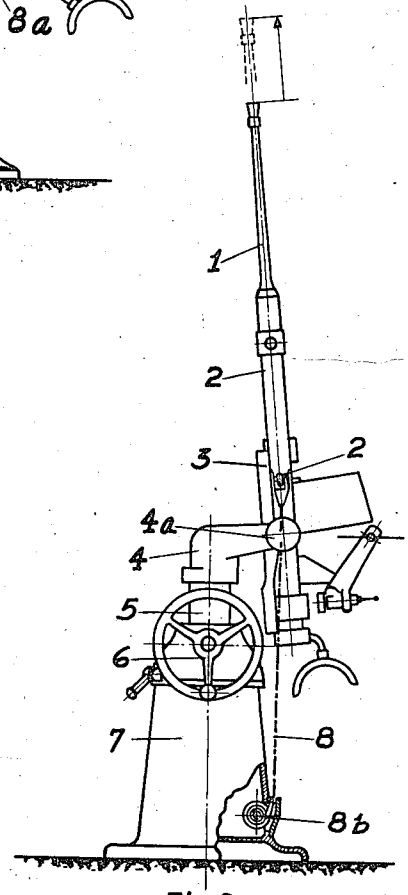

Fig. 2

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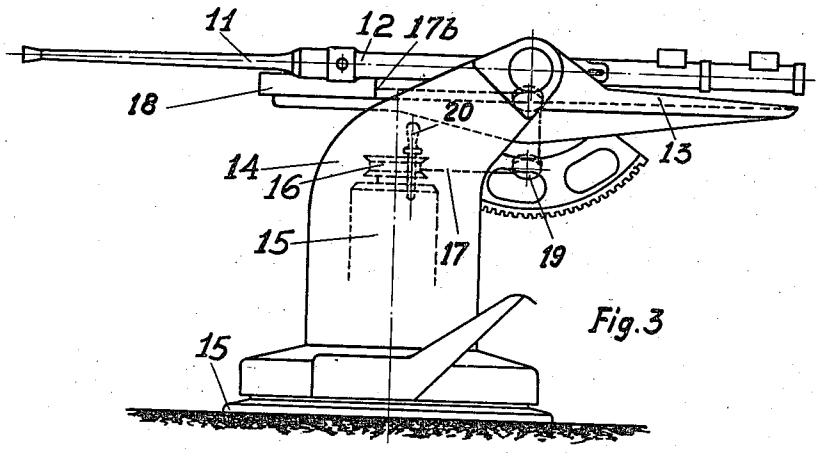

Fig. 3

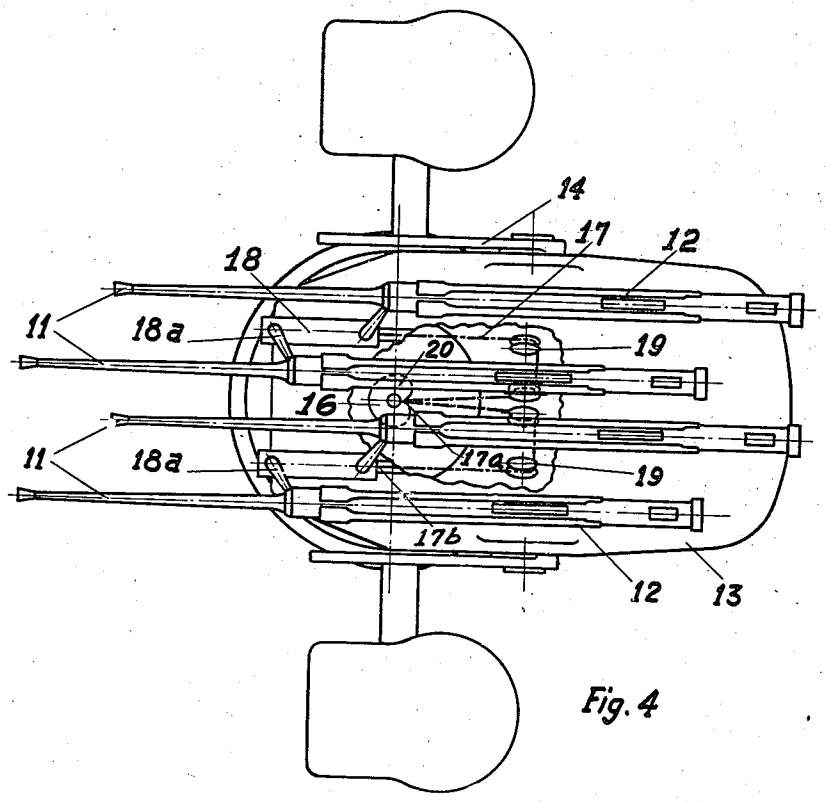

Fig. 4

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Filed April 3, 1940 3 Sheets-Sheet 3

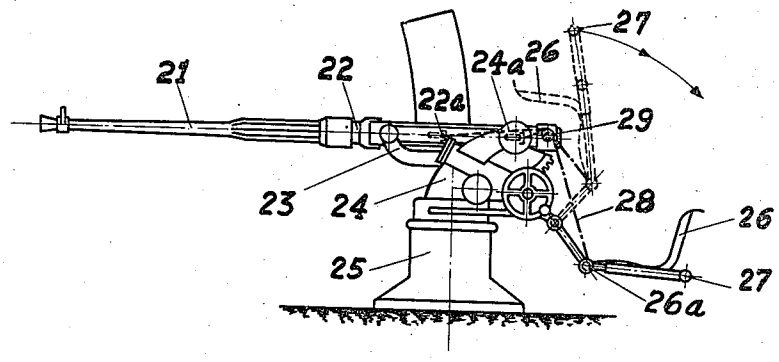

Fig. 5

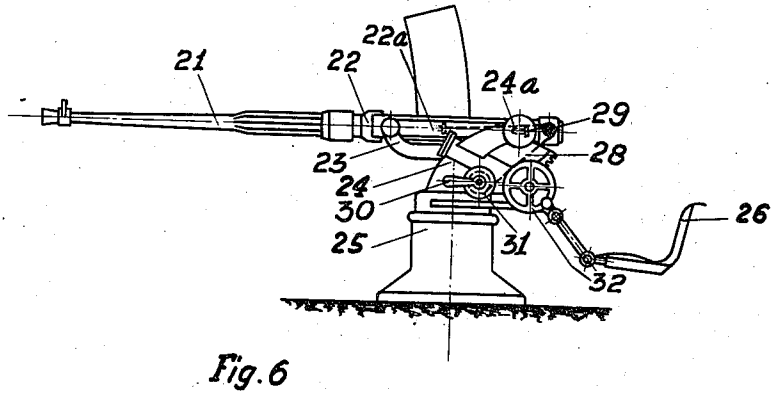

Fig. 6

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MECHANICAL COCKING DEVICE FOR AUTOMATIC FIREARMS

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5 Claims. (Cl. 89—1)

Developments in automatic firearms tend towards ever increasing firing rates and initial velocities. This requires automatically a strengthening of the recuperating elements used to move the gliding parts of the weapon from the cocked position into the firing position. In course of development this strengthening of the recuperating elements overstepped the limit at which direct cocking by hand would still have been possible. This necessitated the use of auxiliary means for cocking and various types of mechanical cocking devices were evolved by technical designers within a short time.

A pneumatic cocking device, for instance, is known in which power and travel are generated in a simple way by means of a compressed-air cylinder. A drawback of this system, however, is the necessity for providing for the supply of compressed air, a matter of some difficulty with mobile guns.

In an attempt to reach by purely mechanical means the required power and travel a lever cocking device was designed and made known, in which the recuperating element is cocked gradually by means of a ratchet and pawl gear and transmission acting on a rack. This ratchet and pawl gear is, however, lacking in the simplicity desirable in weapons. It is, moreover, impossible to reach by these means the working speed sometimes required of such a device.

A further design has become known which provides the mounting with a pedal lever acting as power increasing gear for cocking the breech block recoil spring by means of a wire rope connecting the lever with the gliding parts of the weapon. The drawback of such a device connected with the mounting is that it constitutes an additional element and cannot therefore be used with all types of mountings.

The mechanical cocking device for automatic firearms according to the present invention likewise uses a flexible element for cocking the recoil spring. It eliminates the above mentioned drawbacks by an arrangement ensuring that by a movement that can be carried out with at least one part of the mounting the necessary tractive power is brought to act on the flexible element.

Most of the mounting types for automatic firearms constitute in one form or another lever or gear transmissions for controlling lateral or vertical displacement. Moving parts of the mounting—for instance at the cradle of a swivel mounting or at the folding seat of a pedestal mounting—sometimes enable leverage to be secured. The following description of the present invention mentions several examples of the manner in which the leverage or gear transmissions already provided in the mounting can be turned to account for the purpose of cocking the recuperating elements.

The attached drawings present several constructional examples embodying the object and principles of the present invention.

Fig. 1 shows in elevation a pillar mounting with automatic gun equipped with a cocking device according to the invention.

Fig. 2 is a similar view showing a different arrangement,

Figs. 3 and 4 are, respectively, an elevation and plan of a four-gun arrangement with the cocking device.

Fig. 5 shows in elevation a pedestal mounting with automatic gun in which the cocking movement and power are provided by the folding seat.

Fig. 6 is a similar view of a pedestal mounting with disengageable elevating wheel.

The numeral 1 in Figs. 1 and 2 designates the weapon, and 2 the gliding parts of the weapon. Weapon 1 rests on cradle 3 with which it is rigidly connected. Cradle 3 is supported on arm 4 set on pillar 5 and is made to pivot upon journal 4a. Pillar 5 is adjustable in height by means of hand wheel 6 in the support or pedestal 7. The connecting link between the pedestal and the gliding parts of the weapon is a flexible member such as a cable or rope 8 fixed at one end at 8a or 8b to a fixed part of the mounting. The other end of the connecting link is attached at a suitable point 2a or 2b on the gliding part 2 of the weapon.

In the gun according to Fig. 1 the wire cable 8 is led over the pulley 3a on the cradle 3, and the cocking is effected by inclining the weapon from a nearly vertical position to the horizontal position. The distance between pulley 3a and the pivot 4a determines the leverage and thereby the degree of travel of the cable end at 2a, and thus also directly determines the angle at which cradle 3 and weapon 1 must be inclined in order to ensure the required cocking travel. After the gliding parts have been brought into firing position and the trigger hook has engaged the catch, a slight rotation of the weapon in the opposite direction is sufficient to loosen cable 8 sufficiently for disengaging it from its temporary anchor point 2a to get the weapon in readiness for firing.

Prior to tensioning the recuperating element, the gun according to Fig. 2 is also brought into vertical position, and pillar 5 lowered by turning hand wheel 6 until it reaches its lowermost position. The flexible element 8—likewise a steel rope or other traction means—is then unwound from the spring tensioning pulley 8b and hooked or otherwise temporarily attached at the point 2b. If now pillar 5 with pivot 4, cradle 3 and weapon 1 is raised again by operating wheel 6,

the gliding parts of the weapon, for example the breech block, being held fast by the connecting element 8, do not partake of the upward movement. By raising the pillar for a length corresponding to the cocking travel, the weapon is put in readiness for firing after the cable 8 has been detached. Fig. 2, furthermore, shows in spring tensioning pulley 8b a simple device enabling the cable or other element 8 to be put away quickly to a convenient place from which it can be easily taken at any moment.

In Figs. 3 and 4 the weapons of a four-fold gun arrangement are designated at 11, the gliding parts of the weapons at 12, and the cradle in which the weapons are fixed at 13. 14 is a pivoting frame set on the fixed pedestal 15. Pedestal 15 is provided in its middle with a pivoting heart-shaped body 16 carrying the ends 17a of the cable or other flexible elements 17. The opposite ends 17b are connected with the sliding blocks or followers 18. Each follower 18 is provided with two arms 18a which engage, and thus transmit the movement of the follower to, the gliding parts 12 of two of the weapons. The guide pulleys 19 arranged on the cradle 13 serve to bring the forces in the flexible connecting elements into the axial direction of the weapon.

The arrangement according to Figs. 3 and 4 functions as follows: When starting the cocking process, lock pin 20 is inserted into the heart-shaped plate 16 so that this latter is prevented from rotation in relation to pedestal 15. The mounting is now shifted in direction about a vertical axis by means of the gear provided for this purpose. In the course of this movement the connecting elements 17—for instance steel ropes or chains—are pressed against the heart-shaped body and thus pull the followers 18 carrying with them the gliding parts 12 of the weapon, towards the right. After all weapons have been brought into the cocked position the lateral movement is resumed towards the starting position, and lock pin 20 removed. The followers 18 are brought back into starting position shown in Fig. 4 by their own recuperating elements. The example of Figs. 3 and 4 thus shows how the lateral displacement of the whole mounting is turned to account for the purpose of cocking the recuperating elements.

Fig. 5 shows a pillar mounting in which the weapon 21 rests on the cradle 23 with its gliding parts 22. The upper mounting 24 which carries cradle 23 on trunnions 24a can pivot in pedestal 25. The gunner's seat 26 is fixed on the upper mounting 24 and can be folded up; 27 is a telescopic frame made of tubing and fixed to seat 26. Connecting link 28 is hooked into the gliding parts at 22a, led over pulley 29 at the weapon end and fixed to the folded-up seat 26 at 26a. To cock the weapon, frame 27 is drawn out and folded down by hand together with the seat. The ratio of the distances between 26a and 27 and the hinge on which the seat as a whole pivot, should be selected so as to enable one man of the crew to apply the necessary power and to cover the whole cocking travel. With reference to the example of execution according to Fig. 5 it should be observed that the body weight of the attendant, applied by suspending himself by his hands from the frame 27, can be used as force generating element. Here, too, the connecting element is unhooked and put away after the breech has caught into the breech hook.

Fig. 6 has the same pillar mounting as shown in Fig. 5, and is equipped with an elevating gear including a hand wheel 32 that can be disconnected by means of lever 30. Whilst the elevating gear is disconnected, rope drum 31 is made to rotate by turning hand-wheel 32 which is suitably geared to the drum by a "change-over" gear. Rope 28 wound round pulley 29 pulls backwards the gliding parts of the weapon 22 and thus cocks the recoil spring. The wheel 32 thus serves to aim the weapon and also to cock the recoil spring.

The connecting elements described in Figs. 1–6 do not by far exhaust the possibilities afforded by the present invention. The use of a system of rods is, for instance, an obvious possibility. An essential point of the present invention is the fact that a connecting link of simple and light design enables the cocking process to be carried out quickly and without having to resort to additional mechanical gears and couplings.

We claim:

1. In combination, an automatic firearm having a recoil spring, a support on which the firearm is mounted, means for compressing the recoil spring including a member movably mounted on said support and movable from a first position to a second position, said member having a normal function other than aiding in compressing of said spring, a slidable device on said gun movable to compress said spring, and a flexible, tractive element connected to said slidable device and operatively connected to said movable member, whereby upon movement of said movable member to said second position, a tractive force is exerted on said flexible member and is transmitted by the tractive element to said slidable device for compressing said spring.

2. In combination, an automatic firearm having a recoil spring, a support on which the firearm is mounted, means for compressing the recoil spring including a member movably mounted on said support and movable from a first position to a second position, said member having a normal function other than aiding in compressing of said spring for preparing the gun for firing, a slidable device on said gun movable to compress said spring, and a motion transmitting element connected to said slidable device and operatively connected to said movable member, whereby upon movement of the movable member to said second position a compressive force is transmitted by the motion transmitting element and through the slidable device to the spring.

3. The combination, as set forth in claim 1, wherein the movable member comprises a cradle pivoted to said support and to which the firearm is attached, and a guide member mounted on said cradle and spaced from the pivot of the cradle about which the flexible element passes.

4. The combination as set forth in claim 1, wherein the movable member comprises a gear mechanism constructed and arranged to effect directional adjustment of the firearm.

5. The combination as set forth in claim 1, wherein the movable member comprises a folding seat, the tractive power being supplied by lowering such folding seat to normal position.

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